

## PROGRESS REPORT OF THE PARTIES

### NUTRIENTS ANNEX CHAPTER

#### OVERVIEW

Excessive nutrients entering the Great Lakes are one of the primary causes of the development of algal blooms, which can be harmful to human health and the environment. Of all the lakes, Lake Erie in particular has been experiencing increasing algal growth since the 1990s.

Algal bloom image



Through the Nutrients Annex of the 2012 GLWQA, Canada and the United States commit to coordinating binational actions to manage phosphorus concentrations and loadings in the Waters of the Great Lakes. The focus of the implementation of the commitments from the Nutrients Annex over the first three years is the completion of revised binational phosphorus reduction targets for Lake Erie and work with others to manage phosphorus concentrations and loadings in Lake Erie as a means of reducing excessive algal growth.

[Placeholder: latest SOLEC indicator information to provide a highlight of the environmental state of the issue. Target length: no more than 500 characters. Graphs/charts?]

#### ACTIONS TAKEN TO MEET KEY COMMITMENTS

During the reporting period, binational and domestic actions were undertaken to address the following key commitments from the Agreement's Nutrients Annex. [Language about what/why 'key' commitments? Fulfilling these commitments are the necessary first step to...the objectives of the annex. What does 'key' imply? Many steps... a word about 'other' commitments?]

##### KEY COMMITMENTS:

- By 2016, develop binational substance objectives for phosphorus concentrations, loading targets, and loading allocations for Lake Erie.
- By 2018, develop binational phosphorus reduction strategies and domestic action plans to meet the objectives for phosphorus concentrations and loading targets in Lake Erie.
- Assess, develop, and implement programs to reduce phosphorus loadings from urban, rural, industrial and agricultural sources. This will include proven best management practices, along with new approaches and technologies.
- Identify priority watersheds that contribute significantly to local algae development, and develop and implement management plans to achieve phosphorus load reduction targets and controls.
- Undertake and share research, monitoring and modeling necessary to establish, report on and assess the management of phosphorus and other nutrients and improve the understanding of relevant issues associated with nutrients and excessive algal blooms.

The Nutrients Annex Subcommittee developed the following 2014-2016 Priorities for Science and Action to focus binational efforts to address these commitments.

<b>Binational Priorities for Science:</b>	<ul style="list-style-type: none"> <li>• Undertake science to support the establishment of phosphorus concentration objectives, loading targets and loading allocations.</li> <li>• Identify sources of phosphorus and priority watersheds for action.</li> <li>• Improve understanding of how aquatic invasive species, lake dynamics, climate change and other factors affect phosphorus concentrations and algae growth.</li> <li>• Improve monitoring techniques and approaches to enable tracking progress towards objectives.</li> </ul>
<b>Binational Priorities for Action:</b>	<ul style="list-style-type: none"> <li>• By 2016, update the 1987 offshore phosphorus concentration objectives for Lake Erie and develop new nearshore phosphorus concentration objectives.</li> <li>• By 2016, determine the phosphorus loading targets for Lake Erie, apportioned by country, required to achieve the above phosphorus objectives.</li> <li>• Assess the effectiveness of current programs and practices to manage phosphorus inputs to Lake Erie.</li> <li>• Develop and implement phosphorus reduction strategies and domestic action plans to ensure measures to manage phosphorus produce maximum results.</li> </ul>

### Binational Actions Taken

Actions to describe:

- definition of problem
- modeling
- proposed targets
- public consultation – webinar; binational.net
- finalization of targets
- allocations
- other activities covering the science/action priorities?

The primary action taken in support of these commitments was the establishment of revised binational phosphorus loading targets for Lake Erie. In the span of just three years, the US and Canada were able to work collaboratively and in consultation with stakeholders to conduct a comprehensive science-based assessment of the phosphorus reductions needed to meet Lake Ecosystem Objectives, and reach consensus on new phosphorus limits for the Lake. The Parties have agreed that significant reductions in phosphorus are needed to combat Western basin algal blooms and Central basin hypoxia. Specifically, the US and Canada have agreed to reduce phosphorus loading to the Western and Central basins by forty percent. A new target load of

6,000 metric tons annually was allocated [insert amount once final] U.S. and [insert amount once final] Canada. This load is expected to raise the dissolved oxygen levels in the bottom waters of the Central basin to 2 mg/L. The Parties also identified priority watersheds for phosphorus control to address nearshore blooms. Finally, because the modeling showed that spring loading of phosphorus from the Maumee River in Ohio is the determining factor in the production of cyanobacteria in the Western basin, specific seasonal targets were identified for the Maumee River. A forty percent reduction Maumee spring phosphorus loads is expected to lower cyanobacteria biomass in the Western basin to mild levels in 9 years out of 10.

The revised phosphorus targets, summarized below, were vetted with the public during the summer of 2015 and ratified by the U.S. and Canada in February 2016. These targets address all but one of the Lake Ecosystem Objectives identified in the Agreement. More work remains to be done to address the second Lake Ecosystem Objective, “Maintain the levels of algae below the level constituting a nuisance condition,” which is of particular importance in the Eastern basin of Lake Erie, and in other parts of the Great Lakes. While models were used to explore the impact of phosphorus reduction on nuisance algae (*Cladophora*) growth in the Eastern basin, the confidence in the model predictions is not adequate to recommend a specific target at this time. Additional research is required to link phosphorus loadings to changes in algal production prior to recommending phosphorus reduction targets to address *Cladophora*.

Binational Phosphorus Load Reduction Targets		
Lake Ecosystem Objectives <i>Great Lakes Water Quality Agreement Annex 4, Section B</i>	Western Basin of Lake Erie	Central Basin of Lake Erie
Minimize the extent of hypoxic zones in the Waters of the Great Lakes associated with excessive phosphorus loading, with particular emphasis on Lake Erie	40 percent reduction in total phosphorus entering the Western Basin and Central Basin of Lake Erie – from the United States and from Canada – to achieve 6000 MT Central Basin load	
Maintain algal species consistent with healthy aquatic ecosystems in the nearshore Waters of the Great Lakes	40 percent reduction in spring total and soluble reactive phosphorus loads from the following watersheds where localized algae is a problem:	
	Thames River - Canada Maumee River - US River Raisin - US Portage River - US Toussaint Creek - US Leamington Tributaries – Canada	Sandusky River - US Huron River, OH – US
Maintain cyanobacteria biomass at levels that do not produce concentrations of toxins that pose a threat to human or ecosystem health in the Waters of the Great Lakes	40 percent reduction in spring total and soluble reactive phosphorus loads from the Maumee River (U.S.)	N/A

While in general there was strong public support for these targets, stakeholders expressed valid concerns with the lack of a phosphorus target to address nuisance *Cladophora* in the Eastern basin

of Lake Erie. The US and Canada are committed to continue supporting research, monitoring and modeling efforts that will improve our scientific understanding of *Cladophora* growth and propose further phosphorus reductions to ameliorate nuisance algae impacts in the Eastern basin, if warranted. Recent actions toward this goal include:

- The Nutrients Annex Subcommittee worked with the Science Annex Subcommittee to convene a workshop on the state of the science of *Cladophora* in early 2016. The results of this workshop ...
- Environment Canada research expected to wrap up march 2016
- The US and Canada formed a new workgroup with representatives from EPA, EC, NYSDEC, OMOEE, OMNRF, and USGS to initiate nutrient target development in Lake Ontario. The group will start by examining current trends and data gaps particularly with respect to nearshore *Cladophora* growth as a response to nutrient levels in Lake Ontario.

#### Binational strategy {expected draft in Feb 2016}

The US and Canada prepared a binational strategy for implementation of the Lake Erie phosphorus reductions moving forward. The strategy identifies binational priorities for research and monitoring, with a focus on coordinating our efforts to track progress through an active adaptive management process.

Finally, the US and Canada have begun work to develop domestic action plans and anticipate releasing draft action plans by the end of 2016. These plans will outline in more detail the specific implementation strategies needed to achieve the 40% reductions.

#### Domestic Canadian Actions Taken

- start of domestic action plans
- domestic program efforts to address nutrients

#### Domestic U.S. Actions Taken

- start of domestic action plans
- domestic program efforts to address nutrients

#### Environmental Progress